The Mining Journal

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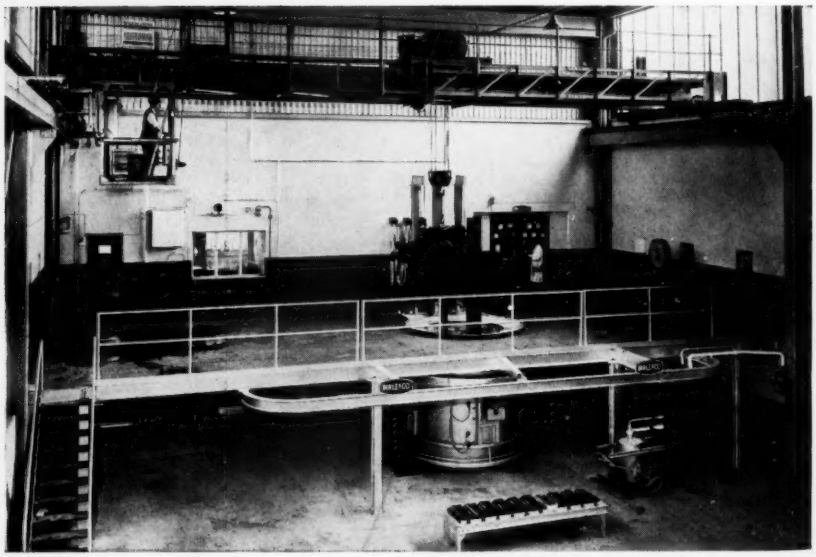

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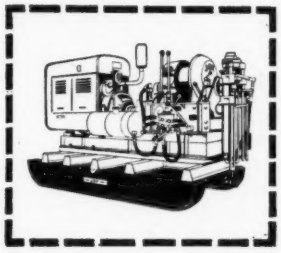

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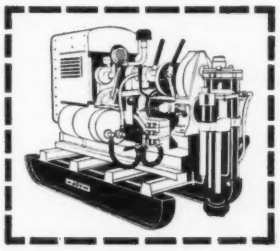

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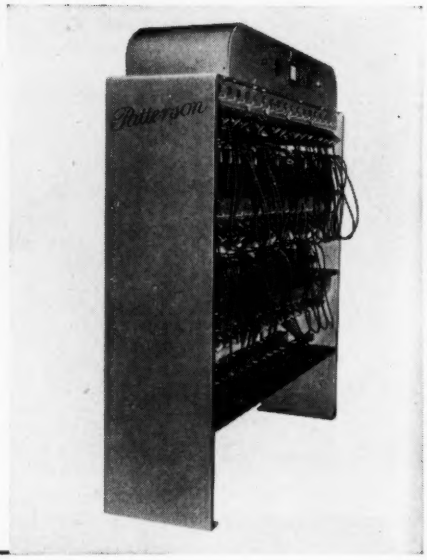

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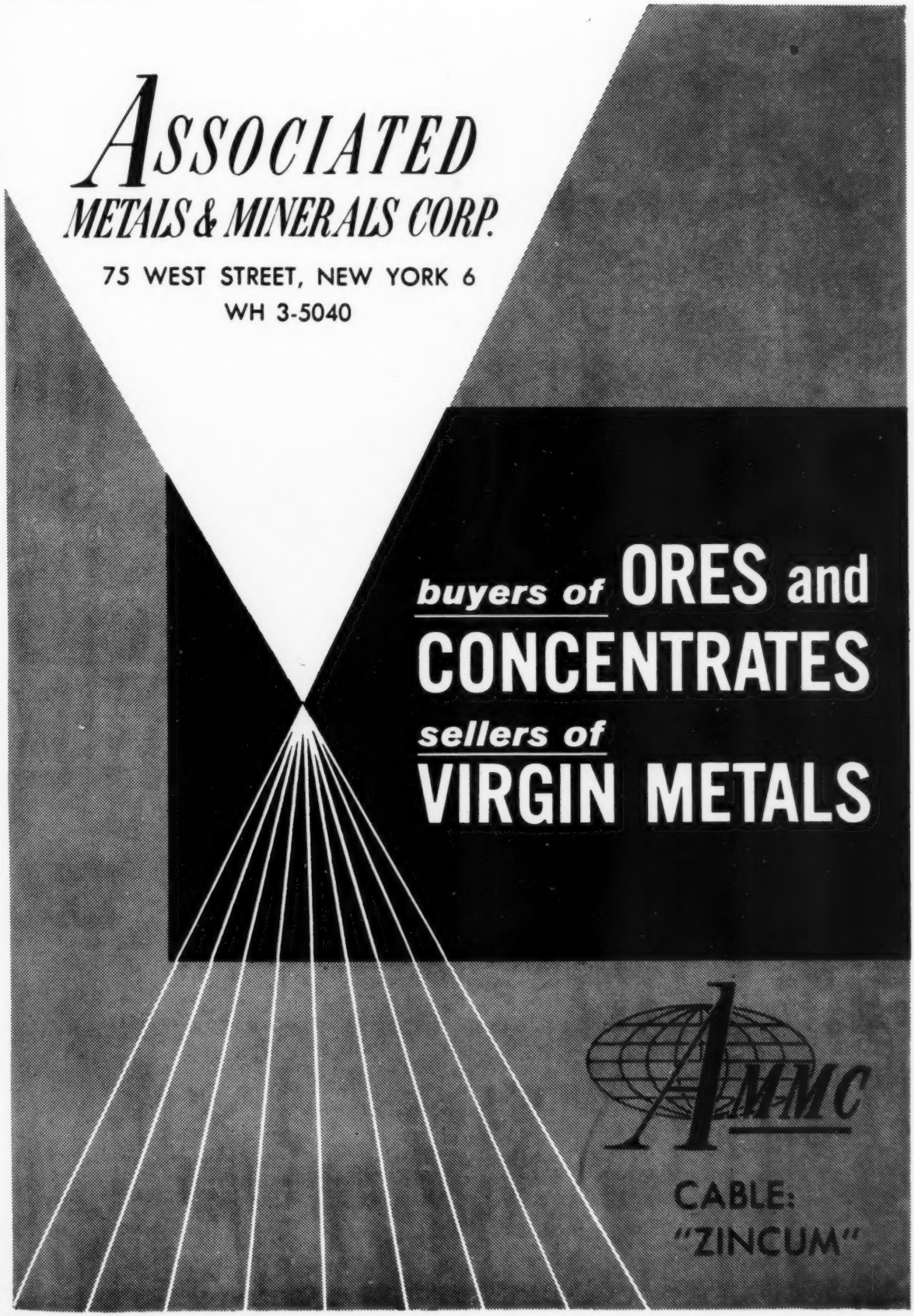
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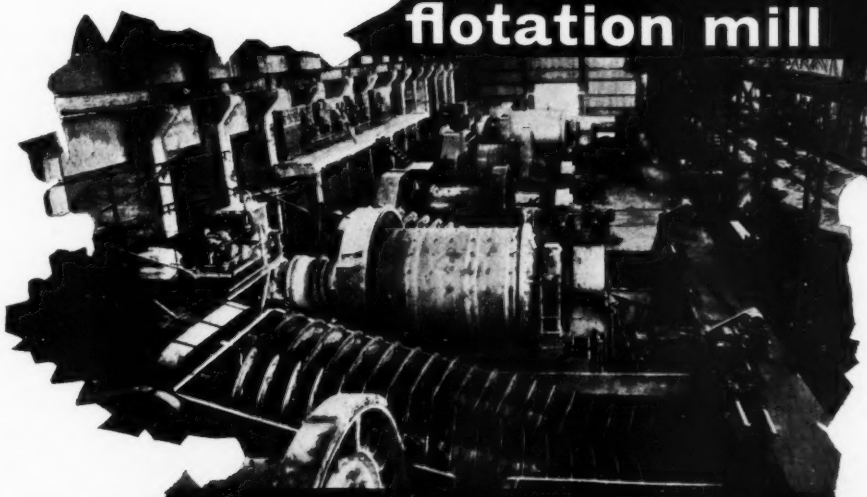

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The Mining Journal

London, April 8, 1960

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Business as Usual — Thinking as Never Before

SUPERFICIALLY, conditions both in Johannesburg and on the mines since the declaration of the state of emergency, have seemed to bear little relation to any situation which the foreign investor might be justified in inferring from the behaviour of the stock markets.

In Johannesburg, business as usual seems to sum up the position, with the hotels still fully booked for the Rand Easter Show and with the speculator mainly concerned about whether to buy the far-from-overwhelming share offerings from London and the Continent at present prices or whether to wait for these to go lower. On the mines, production has suffered almost imperceptible interference with the labour force remaining effectively insulated from urban African discontent.

Despite outward appearances, however, there can be little doubt that European opinion of all shades has been more sharply aroused by the events of the last three weeks than by any other occurrence since the war. In an article beginning on page 405 we have therefore attempted an examination of the political alternatives which now confront the Union. We shall endeavour in our next Quarterly Supplement on South African gold mines, due at the end of this month, to consider what may be the longer term opportunity and challenge for the mining industry itself in the changing situation.

As the principal employer of labour and prop to the Union's economy, the attitude of the mines to the advancement of the African is clearly crucial. Conversely the continued prosperity of the country must for a long time to come continue to depend above all on this industry, so that, whatever its complexion, no government can afford to neglect its welfare. The prerequisites for the continued political stability of the Union are equally prerequisites for the continued prosperity of South African mining. It is a situation in which the voice of the mining industry must command attention.

Mining Taxation in Britain

THE case for a revision of mining taxation methods in the United Kingdom is forcefully presented by the executive committee of the Cornish Mining Development Association in its annual reportforthe year 1959/60.

The report recalls that the Association long ago reached the conclusion that the most effective means of reviving metal mining in Britain would be for the government to grant such tax reliefs as are necessary to make the industry attractive to risk capital. This opinion, it is stated, has been strongly fortified by the action on those lines taken by the Irish Republican Government in 1955, which has already brought about a spectacular revival of mining activity in Eire, where the industry had been practically dead for 80 years. One of the first fruits of this enlightened policy is the great Avoca copper mining enterprise in County Wicklow, which cost £3,500,000

and is now employing 500 men and milling 4,000 tons of ore per day. This great enterprise is now the second largest consumer of industrial electrical power in the whole of Eire. It is understood that the company also has in mind the possibility of manufacturing its own smelter. Should this materialise, the sulphuric acid which would be produced could provide the basis for a new fertiliser industry in Eire.

One of the facts emerging from the Symposium on the Future of Non-Ferrous Metals Mining in Britain and Ireland, continues the report, is that Britain's mineral potential is still very considerable, and of no part of these Islands is this more true than of Cornwall. The mineral production of Cornwall and Devon, at the present price of metals, is estimated to have exceeded £2,000,000,000, a figure which establishes the district as being a mineral field of the first order of output on any world basis of comparison.

" It is abundantly clear," states the report, " that if mining in Britain is to revive and prosper, there must be co-operation between government and private enterprise as there is in Eire, Canada and the U.S.A., etc. However, as has already been pointed out, the one fundamental necessity is that there must be such tax relief as will make the industry attractive to capital. Such reliefs will cost the Exchequer nothing, for in their absence there is now practically no mining industry to tax."

In conclusion, reference is made to the " fantastic situation" in which government tries to relieve comparatively heavy unemployment in Cornwall by scheduling the greater part of the county as a " Development Area ", and yet by its own fiscal policies prevents the revival of mining, the staple industry of the region.

" SPACE-AGE " METAL PROCESS DEVELOPED

Engineers of the Westinghouse Electric Company Materials Engineering Department have developed a process which, for the first time, makes it possible to construct large, metal objects from tungsten, molybdenum, and other superstrong, high-temperature metals and alloys demanded by the space age. Known as continuous powder compaction, the new process compresses metal powders as fine as flour into large uniform metal bars of unlimited length. When baked in an oven, these are fashioned into useful structures by standard metal-working procedures. The new technique works as well with non-metal ceramic powders as it does with metals.

Until the discovery of the new Westinghouse process, attempts to prepare large bars, strips or sheets from powders were expensive, cumbersome and technically difficult to achieve. For this reason, only those small objects which could be pressed directly into their final exact shape have been made commercially from powders.

Since, by present methods, even the largest presses yield only finished objects of relatively small size, there has been a real need for a satisfactory method of compacting powders into large intermediate shapes suitable for further processing. Such " intermediates " would be equivalent to the ingots normally cast from less stubborn metals and could be rolled, forged, or otherwise worked into major metal structures.

The new compacting technique is claimed to be superior to any other known method for large-scale powder compaction. It produces bars of large volume, is rapid and continuous, and uses relatively inexpensive standard-type presses. On a laboratory scale, the process has proved unusually successful in preparing many different metals, alloys and ceramic compositions, and, indeed, if lower cost metal powders become available, the method looks promising for the economical, large-scale processing of common metals such as iron and copper.

Under the new technique, developed by two metallurgists Charles Deibel and Frank Emley, a continuous supply of the powder to be compacted is fed into a three-sided trough, or channel, into which it is pressed by a plunger descending from above. The plunger has a sloping wedge-shaped face which compresses the powder against the bottom of the channel, crushing the powder together to a degree determined by the slope of the plunger face. The powder beneath the thick end of the wedge is compressed to its final thickness; that under the pointed end is compressed hardly at all.

After the plunger makes its downstroke, it rises, and the powder is pushed forward slightly for the next downstroke. On this stroke additional powder is brought from an intermediate to a final compressed state, and the plunger is ready for its next " bite ". In this fashion, the plunger continuously " walks " through the powder moving beneath it, taking in loose powder at the front end of its wedgelike surface and delivering a uniform, tightly compacted bar behind it.

In the experiments, a variety of materials has been compacted into bars with thicknesses in the range of one to two inches and widths up to 12 inches or more. The bars are constant in cross section, uniform in density, and smooth and regular over the entire length.

High quality, however, is not the only advantage claimed for this pressing method. The technique lends itself to a completely automatic system. Raw powder would flow continuously into a press, from which would emerge a continuous bar that passes directly into a sintering furnace for hardening and then into and through any required number of additional processing steps such as rolling, forging, wire drawing, heat treating, and the like.

SELLING BRITISH COAL IN BRITAIN

The marketing of coal is traditionally difficult and in prewar days, selling the mined product was considered the most hazardous hurdle of the production sequence. Today, pit head stocks are prohibitively large in all West European countries—particularly the United Kingdom.

Yet recent news reports indicate that there is, perhaps, some cause for optimism, in that N.C.B. concern over the contraction of existing markets is resulting in a focusing of attention upon the individual consumer.

Speaking at a Press conference recently, Mr. R. H. E. Thomas, marketing member of the National Coal Board, pointed out that coal was " still the cheapest form of heating in the home ". In an effort to awaken the public to the economic advantages of coal, the N.C.B. has arranged with Forward Trust Ltd., a subsidiary of the Midland Bank Ltd., to introduce a new loan scheme.

By means of the scheme, loans are offered for all domestic solid fuel fired appliances, for central heating installations, and for small industrial installations. The scheme will replace an old credit terms plan which involved paying a deposit and interest.

Mr. Thomas emphasized that the scheme is not a hire-purchase commitment.

A further market for U.K. coal has been established by the British Central Electricity Generating Board, which has found suitable sites for the construction of two new coal-burning power stations in the East Midlands, each of which is suitable for a station burning as much as 5,000,000 tons of coal a year. These would provide a gratifying rise in demand from an industry which already consumes 46,000,000 tons a year and is expected to require some 55,000,000 tons by 1965. The National Coal Board are confident of their ability to supply the coal needed from collieries near to the sites of the proposed new stations.

South Africa—A Way Out

UNPREDICTABLE though their outcome is likely to be for some time yet, the present disturbances in the Union have already served to underline three points very clearly. The first is that when driven to open defiance of the machinery of segregation, the Africans have the organisation, intelligence and, most important perhaps, the persistent good nature to seek to attain their objectives by passive resistance. What will eventually happen if these tactics fail is, of course, another matter, but meanwhile the fears of a revolutionary blood bath often expressed by those remote from South Africa are something very different from the notably moderate terms of recent statements from the African National Congress and even from the more extreme Pan Africanists. They are also, despite Sharpeville, something very different from the apparently good-natured tone of most of the mob demonstrations.

Secondly, the Africans have established that power is not the monopoly of the Europeans. Indeed in the long run, the European weapons of the machine gun and the truncheon are likely to prove ineffective against passive resistance, against the selective boycott, against the use of go-slow tactics rather than the strike and of the peaceful demonstration rather than mob violence. All these tactics have been used with some effect by the Africans in the past and whether it be tomorrow, in five or 25 years, they must eventually prevail in a country where the European, outnumbered by 4-1, is economically dependent on the African both as a worker and as a consumer.

The third point is that, in face of the suspension of the pass laws, *apartheid* as a practical policy is bust in theory no less than in practice. In a sense it has, perhaps, never existed in that the *apartheid* laws have been openly disregarded by Africans and Europeans alike and that those administering the laws have had to go through the most embarrassing intellectual contortions in order to reconcile economic necessity with law enforcement.

The Way Out

In any case it must now be apparent that the pass laws are particularly vulnerable to passive resistance. Probably, it would not require even a third of the urban African population to destroy their passes for the system to be rendered unworkable. On the other hand, as things stand at present, a return to normal conditions without the pass laws must mean a gradual breakdown of influx control and the flooding of the urban areas with tribal Africans, attracted by the urban wage packet, yet for whom there are no jobs and consequently no income and no homes. The re-settlement of the tribal African under more tolerable economic conditions is the only alternative to the pass laws on the one hand or urban chaos on the other.

Now, however, we are confronted with a situation where the pass laws have been suspended and disturbance to the economic activity of the country has been threatened (if only in a few trouble spots) partly by the Africans staying away from work first to demonstrate and then to strike (in itself still an illegal act), partly by the call-up of the European citizen army to maintain law and order, a vital prerequisite to whatever the government or the electorate may subsequently decide to do.

However, the present situation cannot continue indefinitely. The Africans must return to work in order to eat if not to escape from the truncheoned attentions of the police, while the European territorials must be equally anxious to return to their jobs and homes. What happens then ? If Dr. Verwoerd attempts to restore the pass laws (as it is now reported to be his intention to do) can this be achieved without further disturbances ?

And looking further ahead, what is to be done next ?

In the first place, whatever is done, time is of the essence. Many precious years have already been lost in shuffling sideways towards an African policy which is now demonstrably unworkable. Meanwhile the tempo of African advancement throughout the rest of the Continent has been so greatly accelerated in the last couple of years that this alone must have upset any preconceived South African programme. Indeed the incidents leading to Sharpeville and its aftermath probably owe more to the southward eddies of Mr. Macmillan's " wind of change " than to anything else. Can it be that the present disturbances are a reaction to the African's fear of the Union either withdrawing or being excluded from the Commonwealth ?

Communication Must Be Established

Clearly the first essential is the establishment of effective channels of communication between the government and responsible African opinion. Equally clearly order must be maintained, but it is difficult to understand the logic behind the proscribing of all forms of African political organisation at a time when it must be apparent that channels of communication with moderate African opinion were never more necessary.

The African National Congress in particular so far seems to be emerging from the present situation as a notably moderate body. The special branch may of course have good reason to know differently, but, if this is so, it is surprising that the government has not justified its action by saying so. Otherwise it is difficult not to sympathize with Chief Luthuli's appeal to the government to call for some sort of multi-racial conference on African affairs. It need commit the government to nothing, but at least it would allow grievances to be heard and communication to be established with responsible African opinion.

It has been the fairly common experience of colonial government that a failure to parley with moderate native opinion eventually leads to open clashes with the extremists. Thus the only predictable outcome of the continued proscription of the A.N.C. is that their leaders will be compelled to find common cause with the P.A.C. and other more extremist elements.

Moreover, among the Europeans in Africa, those in the Union are now almost alone in still being able to negotiate from strength. The Europeans in the Union are a numerous part of the indigenous population, they have developed an advanced civilization which inevitably singles them out as the leaders whatever the basis of the social order. Today there is still time for the European to capitalize on this position. Later it may be much more difficult.

African Resettlement is the Crux

No less important than the restoration of communication with the African is the creation of African confidence in the government's intentions, which now can only come about through a radical liberalization of its African policy. Before going further it is, however, only fair to recognize that despite its inherent unworkability, the whole *apartheid* philosophy, at least in the more sophisticated form of the Bantustans of the Tomlinson report, constituted a sincere attempt by

what might be described as the progressive element in the Nationalist party (with Dr. Vorwoerd himself as the leading spirit) to find a formula for African advancement—economically, socially and even politically at local government level—within a framework of permanent white supremacy.

Small though the chances may have been on grounds of expense alone of such a policy ever finding solid support among the rank and file of the government's supporters, it nevertheless constituted a significant advance on the doctrine of *Baaskap*, which unyieldingly proclaimed the white man's perpetual dominance. However little we may, any of us, have believed in *apartheid*, the fact remains that for leading Nationalists to propound a system in which the black man should enjoy equal but separate rights, represents a tacit admission that, in the long run, room must somehow be found for African advancement.

Indeed had the Tomlinson proposals been implemented long since with energy and in a spirit of benevolent colonialism rather than of dictatorship, and if the European had been prepared to face up to the enormous cost of Bantustan, it is conceivable that a great deal could have been done even within the framework of *apartheid* to re-settle both the tribal and urban Africans on a basis which offered hope of progressive advancement. Complete *apartheid* would still have remained a nonsense wherever the white man was dependent on African labour, but Bantustan *à la* Tomlinson might have reduced the urgency of influx control and with it, from the European standpoint, much of the economic necessity for the universal application of the pass laws.

Be that as it may, African re-settlement remains a first prerequisite of social stability whether under *apartheid* or under any more liberal programme. To achieve this, the alienation of considerable areas of European land to the African's use is unavoidable. Large sums of capital—larger than any visualized in the Tomlinson report — will be needed, both to compensate dispossessed European landowners and to finance the African in his new surroundings, whether on the land or in the setting up of light industries, and equally to educate him in modern agricultural and industrial skills.

The Need for Sacrifice

African re-settlement as an instrument of African advancement, as the Afrikaans' papers were urgently pointing out in the context of Bantustan only a few days after Mr. Macmillan's Cape Town speech, calls above all for sacrifice by the European. This sacrifice, which in the long term is quite likely to prove no sacrifice at all, must come in the main from two directions.

First it must come from the property owner, the investor and the taxpayer, who in the short run will have to find a vast amount of land and capital for investment in the African. Aside from there being virtually no choice between this course and the perpetual threat of economic strangulation, it will in the long term probably prove the best investment the European has ever made. For a long time secondary industry has been confronted with the problem of how to step up African consumption as a foundation upon which to expand home markets. A retreat from *apartheid* could well supply the answer.

The Role of the European Worker

Secondly, this sacrifice must come from the rank and file of the Nationalist party. *Apartheid* has always been the Nationalists' guarantee to the least capable of the European wage earners that their economic security in the scheme of things will not be threatened by more skilled or more hard-working or less well-paid African labour. It is this guarantee which has secured the Nationalist party the solid support of the unskilled and semi-skilled European vote, and it is this guarantee, which the government may not, much longer, be able to give, on the basis of existing racial policies.

Yet if one outcome is certain from the economic expansion which would follow from an aggressively conducted policy of African re-settlement and rising economic standards, it is that the tempo of economic activity throughout the country would rise to the point where the problem would no longer be who was going to get the jobs but where the people were to be found to fill them. Inevitably the government would be left with a residue of European unemployables, but this problem already exists in the Union as it does elsewhere. Every country has to provide for its lame ducks. For the remainder of the Europeans, African economic advancement must mean better, more responsible European jobs, and consequently training and promotion, rather than unemployment and submersion.

There Must be a Coalition

With the way out from the present *impasse* dependent on European labour interests no less than on finance and industry, it must be apparent that neither the present government alone nor any alternative United Party government could hope by itself to command the necessary nation-wide support for a policy of initial economic sacrifice in the cause of African advancement. The present situation is pre-eminently one for a coalition government. Moreover with the Nationalists and the United Party thinking so much alike on most aspects of race relations, a *rapprochement* need not present serious difficulties but for the bedevilment of European political relationships arising from the ancient rift, unhealed, albeit somewhat softened by time, between those of Afrikaans and British descent. It is a tragic irony that the political motivation of *apartheid* since World War II has probably derived as much from the struggle for votes between these two seemingly irreconcilable parties as it has from any compulsions of the African problem. Nevertheless the solution of the latter must now become the focal point of European endeavour, which can no longer afford to be split by ethnic incompatibilities.

The Nationalists can no longer afford to fight the battle on two fronts. In this connection, it is significant that some weeks before Sharpeville the creation of a latter day Hertzog party composed of dissident Nationalists under the leadership of Mr. Basson was being canvassed as an active possibility.

An interesting consequence of a Nationalist/U.P. coalition would be that the functions of leading the Opposition would probably then fall upon the Progressives. There is no reason to attribute as yet to the Progressive Party any significant electoral support in the country, and indeed hitherto it has been clear that at any early general election nearly all the Progressives would have lost their seats. On the other hand, the present is no time for general elections and a situation where the Nationalists and the United Party were in coalition and the Progressives in opposition would at least serve to bring into relief the alternatives facing the European community.

A Time for Re-thinking

Then at least we should have on one side of the House all those European elements in the Union which see African advancement as practicable only within the framework of permanent white hegemony. Nor is this the time to suggest that short term attempts at advancement on these lines are misguided. In the first place the thinking of a whole electorate does not change overnight, and in the short term, the framework of unchallenged white supremacy is the only one within which any solution *can* be attempted.

Secondly, whether because of lack of opportunity or inclination, or whether simply as an index of priorities in elementary human needs, the aspirations of the African have shown themselves far less in the demand for political rights than in the demand for a larger share of the economic cake (which, as we believe, would greatly enlarge itself with the eating) coupled with a recognition of the labourers' right to the elementary human dignities and freedoms. Thus, if the Nationalists acted now, even at this late hour, there is no reason why the lot of the African could not be vastly improved within the existing constitutional and political framework.

At the same time, few thinking people in South Africa today believe that this framework can be left unchanged for all time, and a coalition government, pledged to an energetic attack on raising the Africans' economic standards, might at least give the country the necessary breathing space to re-think its constitutional future, a process in which the existence of a small opposition party pointing to a radically different solution may well play a significant role as catalyst in the inevitably agonizing reappraisal which lies ahead.

The Progressives' Alternative

The Progressives offer a programme of African advancement within the framework of a multi-racial society, which is not to be achieved today or tomorrow but only at the speed at which the African can evolve to participate in responsible democratic government. It is a policy which offers the African, not the mirage of immediate equality for all, but the promise of political and economic growth in stature at a pace limited only by his ability to equip himself for greater responsibility.

This is not a policy which can be expected to command any sizeable measure of support among Europeans in South Africa today, and yet the significant thing to the outside observer about these Europeans in recent years has been the rapid growth among them of political consciousness on the problem of African advancement to the point where today, long before Sharpeville, it had become an abiding anxiety, even if no clearcut solution had begun to emerge.

An important consequence of such a parliamentary realignment might well be a radical change of attitude towards the Union by outside opinion. Neither the other Commonwealth countries nor the United States nor the countries of Western Europe have any cause to bear South Africa ill-will save in respect of its Government's attitude to its racial problems. All these countries have in the past shown a marked readiness to invest in South Africa and will surely do so again if a stable government can be foreseen under conditions which provide for gradual African advancement. Inevitably such external confidence would be basic to the programme of any such government, if only because financial aid would be an essential pre-requisite of African resettlement and advancement.

By great good fortune South Africa finds herself today at a point where her financial institutions have seldom been more liquid, largely in consequence of the coming into production of the new gold mines opened up since the war. This in itself makes financially possible an immediate start on the problem where it might not have been possible ten years ago and obviously, if others are to help, South Africa must first demonstrate its own confidence in its new attitude to the African by getting on with the job within the limits of its own considerable resources.

Nevertheless such an earnest to good-will towards the African could scarcely remain unheeded by the countries of the West, which have long regarded a more constructive approach to race relations in the Union as crucial in the West's bid for the leadership of African aspirations.

NON-FERROUS METALS IN BULGARIA

PRIMARY estimates put Bulgarian copper output at 19,000 tonnes for last year. The country's government is working on a plan to expand copper production in order to provide for its own rapidly growing requirements, and also for supplying to its fellow members of Comecon, the mutual trade body of the Eastern European Communist *bloc*. The target now set for 1962—a revised one—is 22,000 tonnes of electrolytic copper.

Reserves of copper ore estimated at about 10,000,000 tonnes were discovered quite recently in the neighbourhood of Pirdop, near the Black Sea port of Bourgas. Work was started almost immediately on their exploitation and on the construction of the " Georgi Damyanov " plant at Pirdop, for the treatment and refining of the ore extracted.

Extraction was increased, from the former low figure of 25,000 - 30,000 tonnes annually, to 702,000 tonnes in 1958, and was scheduled to exceed 1,000,000 tonnes in 1959. It is expected to expand at a rate of about 250,000 tonnes a year for some years to come.

The treatment and refining of this growing volume of ore has been correspondingly increased since the completion of the " Georgi Damyanov " plant, at the end of 1958. Planned to produce 10,000 tonnes of electrolytic copper annually, this plant fell very little short of that target in the first year of its operation, but the target had already been raised. The present programme calls for 17,000 tonnes of electrolytic copper annually by 1962, and 25,000 tonnes by 1965.

The discovery of additional reserves of copper ore last year has made it possible to step up the output of copper still further. Extensions of the " Georgi Damyanov " plant which are now in progress will double its capacity by the end of next year, and treble it eventually.

It is further reported that a new flotation plant is in course of construction near the village of Sgurigrad, in the neighbourhood of Vratsa, to handle rich deposits of copper and lead-zinc ore, estimated at about 15,000,000 tonnes, which have been located in the Gladna region. This plant, which is fully mechanized, has an initial capacity of 500 tonnes of ore daily, which will be doubled when the second part is completed, in the latter half of this year.

A much larger flotation plant is envisaged, to deal with the ore produced from the Rhodope lead-zinc ore mines, where production is expanding far more rapidly than can be coped with by the existing plants. The site selected for this is at the junction of the road from the village of Erma Reka with that running from Madan to Zlatograd. This site was chosen for three reasons; first, because the confluence there of the rivers Gyudyurska and Erma should guarantee an adequate supply of water; second, because promixity to the town of Zlatograd obviates the necessity of providing new housing and social services; and third, because it lies in the centre of, and at a distance of not more than seven or eight kilometres from the mines which it is intended to serve. These are in the first place, the newly-opened mines " Stratiev Kamuk " and " Kriviyat Gaber ", to which will be added shortly mines in the process of being opened up at Annovo, Shumachevski Dol, Metlivko, Laikov Chukar-South, Barska Padina, and Byalata Voda, and eventually those opened up as the result of prospecting now in progress around Alamovtsi, Kozarska Reka and Startsevo.

The plant is to be completed in two stages, the first of which provides for a daily capacity of 1,200 tonnes, and the second, for a further 2,000 tonnes. The average metal content of the ores will be: lead, over 2.90 per cent and zinc, over 2.36 per cent.

Mineral Resources of Rajasthan and Ajmer

The Economic Geology and Mineral Resources of Rajasthan and Ajmer are surveyed in Volume 86 of the " Memoirs of the Geological Survey of India ". The author is B. C. Roy, D.I.C., M.Sc., Dr.-Ing., F.N.I., Superintending Geologist, Geological Survey of India

SINCE Dr. A. M. Heron's account of the known mineral resources of Rajputana was published in the Transactions of the Mining and Geological Institute of India in 1935, the merging of the Princely States with the new Rajasthan State and the formation of the new State of Ajmer has improved the outlook for the mineral industry. Contrary to earlier belief, it is now apparent that Rajasthan is one of the major mineral provinces in India and that her mineral industry is bound to grow rapidly in the near future.

World War II provided an incentive to mineral development in this area, particularly in respect of mica, beryl, rare earth minerals, columbite-tantalite, etc., and a Mica Production Section of the Geological Survey of India was established with headquarters at Ajmer. The war led to the re-opening of wolfram mines near Degana in Jodhpur and the Zawar lead-zinc mines by the India Government, the latter with help from the Mawchi mines of Burma. Though the Zawar mines were later closed down, they have since been proved to contain valuable reserves of lead-zinc ores and are at present being steadily developed.

At present, over 100 localities are being worked for mica both in Ajmer and Udaipur, while numerous mica mines are working in Jaipur, Jodhpur, Kishengarh, Sirohi, Tonk, Dungarpur, Shahpura, Bundi, Alwar and Bharatpur. In mica production Rajasthan now ranks next to Bihar.

Beryl has now been recorded from about 75 localities in Ajmer and over 100 localities in Udaipur as well as elsewhere in Rajasthan.

Ball clays, bentonite, emerald and vermiculite have been discovered in recent years and the first three minerals are now under exploitation.

Several deposits of gypsum have been recorded and Rajasthan is now the principal producer in the Indian Union of gypsum and steatite, excellent reserves of the latter having been developed in Jaipur and Udaipur.

Systematic geological mapping of selected areas, such as the mica bearing areas of Ajmer and the adjacent country is being carried out but is hindered by lack of modern one-inch topo-sheets. As the latter become available areas rich in minerals will be systematically mapped, though this will be a slow and lengthy process. More trained officers are slowly becoming available to the Geological Survey of India.

Mining Legislation

Before their integration with the Indian Union, the Princely States of Rajputana enjoyed mineral rights and controlled the granting and renewal of mineral concessions within their respective territories. Although most of the former States of Rajputana adopted a procedure similar to that in British India, in practice no uniform policy was followed with respect to the granting of prospecting licences or mining leases or in respect of area or period of lease, payments of rents and royalities, etc. Though some rulers discouraged private development, the encouragement of private prospecting and mining often lead to fresh mineral discoveries and the development of mineral industries.

Security of mining tensure was not fully appreciated in many of the States of Rajputana and this led to systematic working without regard to conservation.

Following integration, the Government of Rajasthan established a separate Department of Mines and Geology under the administrative control of the Commerce and Industries Department to develop the minerals industry. All the executive work relating to quarries, mines and minerals is done by the Director, Department of Mines and Geology, with headquarters at Udaipur. There are also five divisional offices, each under the charge of an Assistant Director or Mining Engineer, at Udaipur, Jaipur, Jodhpur, Bikaner and Kotah.

Leases and prospecting licences for minor minerals are given by the Department of Mines and Geology as per quarry rules in force in the various divisions. The licences and leases for major minerals and certificates of approval are granted by the Commerce and Industries Department of the State Government as per the Central Mineral Concession Rules, 1949.

General contracts of areas bearing minor minerals are given to individual contractors on terms and conditions prepared by the Department of Mines and Geology. Rights to work minor minerals are generally sold either by public auction or by tender, and the contract is usually a contract for the direct working and export of minerals or a royalty collection contract.

Activities In Ajmer

In Ajmer State, all matters relating to the granting of prospecting and mining leases are considered by the Deputy Commissioner, Ajmer, under the administrative control of the Revenue Department. The Mineral Concession Rules 1949 are being generally followed with respect to major minerals.

Acting upon the recommendations of the National Mineral Policy Conference in Delhi in January 1947, the Government of India drew the attention of all State Governments including Rajasthan and Ajmer, to the subject of fresh grant and renewal of mining concessions within their respective territories, on a uniform basis, with the object of ensuring systematic mining and mineral conservation. Some tentative, general principles were outlined with regard to minerals which are mined solely for export to foreign countries, and it was pointed out that the Indian Bureau of Mines, when set up, would examine the existing rules and practices prevailing in various parts of the country, so that eventually the Government of India would adopt a uniform policy in the matter of grants of mining concessions. Since then, the Indian Bureau of Mines has been established and new mineral concession rules have been drawn up, which apply to Rajasthan and Ajmer also. As the old leases granted by the previous State Government's lapse on efflux of time, the Government of Rajasthan will apply the provisions of the Central Government's Mineral Concession Rules (1949) to the grant of new leases and licences.

FURTHER USAGE OF ALUMINIUM IN MINING

One of the notable developments in mining during recent years has been the increasing introduction of aluminium equipment in both underground and surface operations. The following article describes two current developments whereby aluminium finds underground application, and may be regarded as an adjunct to the two articles on the same subject which appeared in our issues of June 5 and 12, 1959

THREE mine cages constructed of aluminium alloy have recently been placed in service on the West Rand. The cages were manufactured by Machet Engineering from B51SWP extruded aluminium sections and M57S half hard sheet supplied by The Aluminium Co. of South Africa (Pty.) Ltd. The saving in weight resulting from the use of aluminium has enabled the cages to be constructed as 3-deck units and they have now replaced the original 2-deck cages at the mine without any alterations to the winding gear. It is believed that these aluminium cages are the first of their kind to be constructed in the Union of South Africa.

Total weight of each all-riveted cage is just under two tons—1.4 tons of steel and half-a-ton of aluminium. Steel had to be used for deck struts as extended aluminium alloy sections of this size could not be obtained in time.

The top of each of the cages, bridles and draw gear are fabricated from steel. The cages hang in the bridles and are held at the top by means of hooks on to a 3-in. solid steel bar going through bridle and cage. Pins and lugs hold the bottom of each cage to the bridle, this method of attachment enabling the cages to be quickly and easily removed and replaced by skips when desired.

As the rivets were not obtainable locally, Machet Engineering made their own. These were driven by pneumatic hammer, and considerable experience was gained in driving cold aluminium rivets.

The methods of construction followed closely those used in fabricating steel structures, with the exception that all working was done cold. All mated surfaces were painted with zinc chromate paint, especially where steel came into contact with aluminium as in the case of the rails on the decks. B51S is a structural alloy.

The aluminium story is continued from the United States, where Irwin-Sensenich Corporation has recently developed a new type welded aluminium mine car that weighs nearly 50 per cent less than conventional cars. The new aluminium car is currently undergoing operational tests in a West Virginia coal mine.

The weight savings provided by all-aluminium mine cars would permit an operator to haul additional 18-ton fully loaded cars without increasing the normal gross train weight. For instance, 23 fully loaded cars of the type being tested would weigh approximately the same as 20 loaded steel cars of equal capacity.

The new car was fabricated from 5083 aluminium alloy plate and 6061 alloy extrusions made by Kaiser Aluminium Co. The 5083 is a high-strength alloy developed for its excellent weldability, while 6061 is a widely used structural alloy.

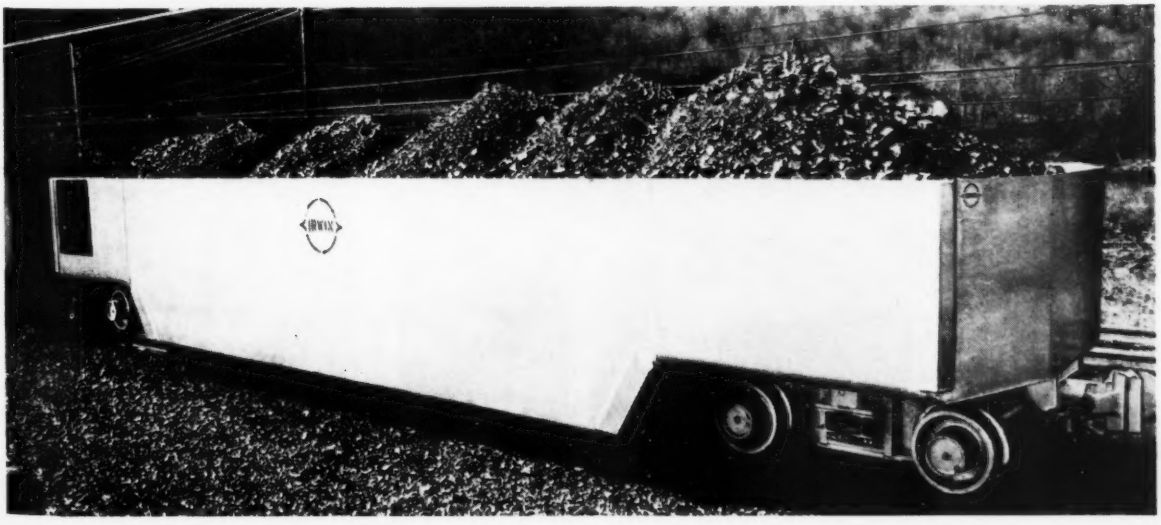
Weight of the aluminium car is 6,840 lb. compared to 12,730 lb. for a steel car of the same size. It measures 26 ft. long, 7 ft. 1¼ in. wide and 4 ft. 5 in. high. Capacity is 625 cu. ft., and 18 tons of coal.

In addition to its light weight, another advantage of aluminium for mine car service is its superior resistance to the corrosive action of the sulphur content of coal. The car is also expected to be less noisy in operation, easier to re-rail and easier to re-square if the body is damaged.

The body of the car is fabricated from ¼-inch 5083 plate and 6061-T6 aluminium extrusions for corner stiffeners and supports. Welding was by the shielded metal arc consumable electrode (MIG) process, with 5183 welding wire used as the combined electrode and filler material.

In fabrication, precautions were taken to prevent the possibility of galvanic corrosion where the aluminium body is in contact with the steel undercarriage: zinc chromate primer was used on the aluminium surfaces, steel surfaces were cleaned, primed and given two coats of paint and a compound applied between the mating surfaces.

A welded all-aluminium mine car, weighing nearly 50 per cent less than conventional cars, recently fabricated by Irwin Sensenich Corporation, U.S.



Machinery and Equipment

New Charging Aggregate for Blasting

A new charging aggregate which is expected to result in an increased use of ammonium nitrate as explosive for rock blasting was recently demonstrated to the Press at the new big underground steam-power plant at Stenungsund, on the Swedish west coast. Developed in collaboration with the State Power Board and designed by Mr. R. Oscarsson, Stockholm, the aggregate is marketed under the name of Blu-Rox by the Gothenburg firm of consulting engineers, Durox Export Co. AB.

Sweden is the first country in the world to employ ammonium nitrate as explosive for underground rock blasting. Although the cost of ammonium nitrate is only one-third of that of dynamite, the explosive power of the former is claimed to be fully comparable with that of the latter. Moreover, the rock is blasted in smaller pieces, which facilitates transport and processing.

The discovery that ammonium nitrate could be used as explosive when combined with an activating agent was made as long ago as 1867. But not until recent years was it discovered that the best blasting effect was attained when ammonium nitrate was mixed with mineral oil. The difficulties in finding an effective way of charging the drilling holes with the mixture have, however, prevented a commercial adoption of this explosive.

The new aggregate is reported to solve this problem. Besides mixing the ingredients in the right proportions it rapidly charges holes drilled at any angle, including straight upwards. Two-in. bore-holes are charged at a rate of 15-20 m. (50-60ft.) per min. This capacity is said to surpass any other method used for various types of explosives. The Blu-Rox machine would therefore entail considerable savings also from that point of view.

The use of ammonium nitrate involves increased safety, as it is insensitive to blows and can only be made to explode by activation with dynamite. Redrilling of holes previously filled with the nitrate can thus be done without risk. The new aggregate, reported to have aroused the keen interest of the mining industry in Sweden and abroad, is at present in service in four places in Sweden, *inter alia* in the Boliden mines.

NEW ROPE BELT CONVEYOR

A new rope conveyor system announced by Joy-Sullivan Ltd., employs as a primary component the Limberoller idler — already widely used in British industry. The new Limberope system enables the features of Limberoller operation to be extended to a much wider range of applications.

The installation comprises flexible Limberollers mounted in rigid, tubular steel cradles, which in turn are suspended at each end between parallel wire ropes. These stringers are held at the required height by chains attached to stands, carrying integral return idlers.

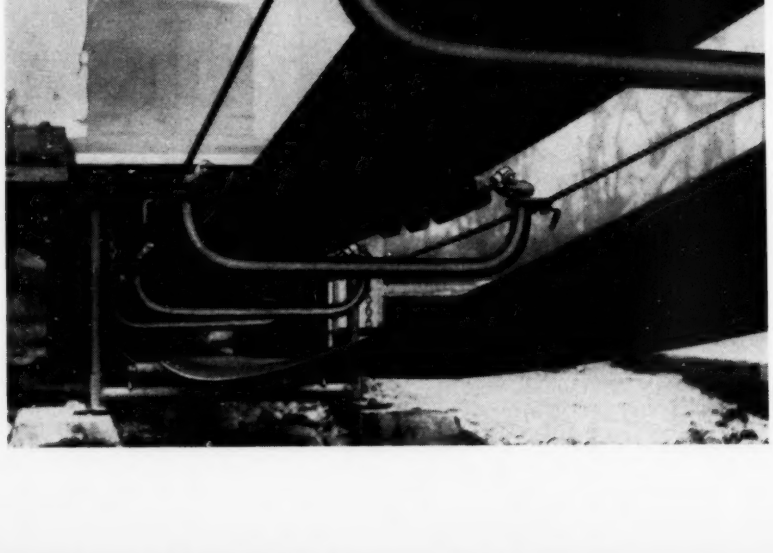
A feature of specific interest for the temporary conveyor operator is the speed with which an entire system can be set up, dismantled and relocated to meet various point-to-point conveyor requirements. This is facilitated by quick-release handle-bolts on cradle bracket and support stands, and further enhanced by the low tension required on the wire stringers between anchor points.

The manufacturers state that a complete system can be installed at a price which compares very favourably with conventional rigid conveyors. The intrinsic design of the system permits insertion of Limberollers and support stands at wide intervals — Limberollers from 4 to 9 ft., stands from 12 to 40 ft. —depending on the load carried — and caters for densities up to 150 cu. ft./lb. class. Thus on a long run substantial economies may be effected on capital expenditure. The Limberope system can be applied to any belt width from 16 in. to 36 in., wire rope dia. varying from ½ in. to ¾ in. to cope with the extremes.

It is claimed that the Limberope conveyor is particularly suited to outdoor applications, where the conveyor follows ground contours and spans gullies, etc., without the need for elaborate support structures. On underground mining installations, the conveyor is very quickly extendible to keep pace with rapidly advancing faces, at a rate of approximately 20 ft. per man/hour.

Improved load handling characteristics inherent with the Limberoller idler conveyor are stated to remain unimpaired in the Limberope system. The flexible idler in its swivel mounting conforms to the load, and provides a cushioned ride which absorbs shock and surge loadings. Belt life is extended because there can be no pinching and there are no projections to rip the belt. The troughing catenary exerts a self-centring action on the material, largely preventing spillage and underbelt material build-up. The manufacturers draw particular attention to the no-maintenance feature. Two bearings only carry the idler, instead of the usual six, and are of the self-lubricating sealed-for-life type, situated well above the dirt zone.

The Joy Limberope rope belt conveyor recently introduced by Joy-Sullivan Ltd.



WATER INFUSION PUMP AND GUN

Richard Sutcliffe Ltd. announce the introduction of a new type of water infusion pump and a new water infusion gun.

The water infusion pump is arranged for variable output and consists of an oil hydraulic circuit which drives two reciprocating rams which are in turn directly coupled to the two rams of the water pump. The oil is supplied from a variable delivery pump which allows the oil circuit to select automatically the pressure and quantity of water to which it is best suited. The output of the water pump is 8 gal. at 3,000 lb. per sq. in. and is infinitely variable down to 22 gal at 1,100 lb. per sq. in., the pressure and volume varying inversely.

The control of the pump can be adjusted so that an output of 5 gal. at 1,500 lb. per sq. in. can be obtained to supply water for a conveyor ramming system at the same time. Under these conditions the oil circuit can be used to drive, say, a stable hole conveyor or a hydraulic drill. The variable delivery oil pump is driven from a 30 h.p. fan cooled, flameproof electric motor.

Mounted above the electric motor and pump is a mild steel tank with two compartments in which are stored the water and the hydraulic oil. A temperature thermostat is fitted to the tank. The whole of the equipment is mounted on a mild steel fabricated baseplate. The mounting brackets for the wheels are so arranged that they can be readly allowed to suit any gauge. The new infusion gun has been designed to work with this equipment.

GAS DETECTOR

Developed by Mine Safety Appliances Co. of Canada Ltd., the Nitrogen Dioxide Detector combines a chemically-treated glass tube and an aspirator bulb to provide rapid, spot measurements of toxic concentrations from one-half to 50 parts per 1,000,000.

To perform the test, the detector tube is broken off at each end and inserted into the frame holder attached to the aspirator bulb. The inlet end is placed in the atmosphere to be measured and a sample drawn by aspiration of the bulb. One or three squeezes may be required, depending on the degree of sensitivity desired. The length of stain caused by reaction of nitrogen dioxide with the impregnated chemical is a measure of toxic concentration, and can be read in parts per 1,000,000 from a scale on the instrument. Sampling from a remote location is also possible with the detector. The instrument is housed in a leather carrying case, complete with 12 detector tubes.

STAINLESS STEEL FILTER

Sintered Products Ltd. is now producing a Porosint Rigimesh, a new stainless steel filter.

A member company of the Sheepbridge Engineering Group, Sintered Products has pioneered the industrial development of powder metallurgy in this country. Sintered DURASINT structural component parts are produced by this company in a wide variety of complicated shapes in many materials including iron, iron alloys, nickel steel, stainless steel, and bronze. POROSINT, another product of this company, is a sintered porous metal which has been developed to meet the growing demand of industry for a filter material possessing controlled porosity together with high mechanical strength.

The new filter material, Porosint Rigimesh, is a woven wire mesh made rigid by furnace welding the wires of the weave at all contact points. The standard material is manufactured in stainless steel, but it can also be produced in Monel, Nimonic75, nichrome, bronze and nickel. Rigimesh is claimed to filter with porosity ratings from 5 to 100 microns in regular production, and if necessary it can be produced to remove all particles greater than 2 microns.

FIRE-FIGHTING EQUIPMENT

94 page illustrated catalogue entitled *Easy-to-Handle, Certain-to-Operate Fire-Fighting Equipment* has been produced by Nu-Swift Ltd., of 25 Piccadilly, London, W.1, and Elland, Yorkshire. The principles of design and construction of portable fire extinguishers are discussed, together with the three principal methods of fire extinguishment — starving, smothering and cooling. Risks are classified under three main headings and examples are given of the types of Nu-Swift portable fire extinguishers and other fire-fighting equipment suitable for each type of risk. Detailed descriptions follow of a number of Nu-Swift models, their advantages, method of operation, and the risks for which they are specially recommended.

JAW CRUSHER BULLETIN

Twenty-one modern operating advantages of the *A-1* jaw crusher are described in a new bulletin released by Allis-Chalmers.

Copies of "*A-1* Jaw Crusher," 17B6369E, content of which includes dimensions and capacity tables on these double-toggle crushers with anti-friction bearings, are available on request from Allis-Chalmers, Milwaukee 1, Wisconsin.

Technical Briefs

New Chemical Engineering Processes

Representatives of the Ministry of Development and of Israel Mining Industries Ltd. have recently disclosed that two new chemical engineering processes, invented and developed by the research staff of Israel Mining Industries, have attracted international interest and rights to them were sold to two foreign concerns in January this year. The processes, involving the production of tetrabromoethane (T.B.E.) and of phosphoric acid and based on the stepped-up exploitation of the mineral deposits of the Dead Sea, may, according to the estimates of experts, provide this country with a considerable dollar source of income.

First customers for the phosphoric acid process which uses hydrochloric acid as a raw material were Toyo Soda Manufacturers Company of Tokyo, Japan. They acquired non-exclusive rights for a round sum of $50,000. Israel Mining Industries will supply all essential data and provide assistance for the construction of the first Japanese plant. An Israel pilot plant will shortly be set up at Sodom. It is assumed that several other Japanese companies will also apply for process rights in the near future, as the new method has aroused wide interest, mainly owing to the world shortage of phosphoric acid.

The second process, concerning T.B.E. production, also involves a new and revolutionary technique in the field of ore and mineral dressing. This process was purchased by the British firm of Baker and Perkins which engaged the services of Mr. S. W. Patching, former head of the Harwell laboratories, to supervise the new method. The tetrabromoethane process will find extensive use in the exploitation of low-grade ores and its application to standard ores is an improvement over the most efficient dressing methods hitherto known. All the T.B.E. required in the process will be supplied by Israel under the company's exclusive patented method. Israel Mining Industries Ltd. will guarantee the steady supply at rates insignificant in relation to the value of the processed ores. An important export problem was to devise a method for the shipment of the liquid (96 per cent pure bromine) which is three times as heavy as water, in standard metal barrels.

Baker and Perkins have obtained the exclusive sale rights of T.B.E. ore dressing installations in the Commonwealth countries and an option on the U.S.A. market and have agreed on an advance payment to Israel of $120,000 which will be used for the erection of a T.B.E. pilot plant in the Sodom region. The British compay will also invest in research work in Israel.

CATIONIC CHEMICALS AS FLOCCULANTS

Aqueous suspensions containing particles with negatively charged surfaces lend themselves to flocculation by cationic chemicals, provided that these are water-soluble and sufficiently low-priced to warrant their use. Such products are the Arquads (quaternary ammonium salts) and the Duomacs (diamine acetates), produced and marketed by the company, Armour Hess Chemicals Ltd.

A typical commercial application for the Duomacs and Arquads is the flocculation and settling of colloidal silica where other conventional flocculants have failed. Mineral silica, clays, and iron ore suspensions are other materials where cationic flocculants give good results. These chemicals are very efficient, and amounts used vary from 0.001 lb. to 0.5 lb. (0.5-250 p.p.m.) of chemical per ton of suspended solids.

A particular advantage of the Arquads —which are strong algaecides — is that, simultaneously with their use as flocculants, algae growth is effectively controlled. Where algae growth is a problem the use of this type of flocculant is therefore exceedingly economic. Further data on these flocculants and their mode of use is described in *Market Development Memo.* No. 10, now available from Armour Hess Chemicals Ltd., 4 Chiswell St., Finsbury Square, London.

SHAPING OF HIGH-PURITY TUNGSTEN

The U.S. Bureau of Mines recently announced a "vapour-deposition" process for making useful shapes of high-purity tungsten. A technical report presents a step-by-step description of the successful forming of tungsten into tubing of 99.996 per cent purity. The attainment is considered especially significant because the nation's space and missiles programme requires heat-resistant materials. Tungsten has the highest melting point of all metals—6,170 deg. F.

It is possible to obtain a copy of the publication by writing to the Publications-Distribution Section, U.S. Bureau of Mines, 4,800 Forbes Ave., Pittsburgh 13, Pa., and request *Report of Investigations 5539, "High-Purity Tungsten by Fluoride Reduction."*

RADIATION EFECTS ON BITUMINOUS COAL

Exposure to atomic radiation alters the physical and chemical characteristics of certain coals, but leaves most varieties substantially unchanged, the U.S. Bureau of Mines has announced, in reporting preliminary results of its first efforts to determine the effects of irradiation on bituminous coal.

In certain ranks of bituminous coal, irradiation also disturbs the delicate electrical balance within the coal molecule. This may make the coal react more readily with other materials and thereby permit improvements in processes for converting coal to liquid fuels and chemicals. Considerable research will be required to confirm this possibility.

In small-scale experiments to date, the Bureau has analysed irradiated samples representing all ranks of bituminous coal, including lignite. The samples, prepared in both powdered and lump form, were small, most of them weighing less than an ounce. They were subjected to high-level doses of neutron and gamma-ray bombardment in government-owned atomic installations. Although results of the investigations thus far are not spectacular, they are encouraging enough to warrant further experiments.

MINING MISCELLANY

Pickands-Mather Co. announce from Duluth, U.S., that production will be cut in five of their mines during April. Rabbit Lake mine on the Cuyuna Range in Minnesota would probably not be worked during 1960; the Danube mine on the Mesabi Range will only operate at half capacity; and Newport, Geneva and Peterson mines near Ironwood-Bessemer, Mich., would operate on a four-day week, with every fourth week idle. U.S. steel has reported that it is shutting down one of seven open hearth furnaces at its American Steel and Wire plant in Morgan Park, Duluth. Reduced demands from the Midwest area are said to be the cause of the cutbacks.

*

Voluntary workers, using power cutting equipment cleared a N.C.B. Merthyr Vale mine shaft of a large cast iron obstruction 100 ft. long and 4 in. thick which had been blocking the shaft for 90 years. British Oxygen Co.'s operators working for two consecuive weekends—a total of 31 cutting hours—completing the operation without loss to colliery output. Cutting was carried out at 400 ft. to 500 ft. below the surface of a 1,400 ft. deep upcast shaft.

*

Mr. Labow, a Toronto mining engineer, is adapting a skin-diving outfit to explore the lake bottom in the Red Lake area of Canada. Damming and pumping out a portion of the lake was too costly, and Mr. Labow plans to use high pressure jets and/or suction equipment to clear the silt. It is intended that colour photography used on rock formations, and possibly a television transmitter may also be used.

*

Iron and many other types of mineral ores are claimed to exist in extensive deposits discovered in the Brazilian State of Bahia. Brazilian experts are studying the deposits at the site, but no means of transportation yet exists.

*

South Vietnam Government is reported to be expanding the state-owned coal mine at Nong-Son. With a present monthly production rate of only 3,000 tons, the sinking of new workings and other developments are expected to bring the output up to a monthly capacity of 120,000 by 1963, enough to cover domestic consumption.

*

Mr. Diefenbaker, Prime Minister of Canada, has stated that there would be no nuclear tests in the Athabaska tar sands, while there might be risk of upsetting East-West negotiaticns on disarmament, and a nuclear test ban treaty. It had been reported from Washington that the U.S. Atomic Energy Commision had been planning an explosion, to be paid for by the Richfield Oil Corporation of Los Angeles, in an attempt to release oil from the sands.

The Marcona mining corcern of the U.S. is to invest some $25,000,000 in Peruvian iron ore workings. Marcona is planning the building of a second ore-port at San Nicolas, the erection of an ore refinery and the laying of a conveyor belt from the ore-working plant to the port.

*

The West German firm of Kloeckner-Humboldt-Deutz is starting work on a £2,300,000 contract for machinery ordered by the Empresa Nacoinal for their copper mill in Santiago, Chile. The work should be finished in three years, and provide for an annual output of 30,000 tons of blister copper. 150,000 tons of copper concentrate and ore would be needed to produce this quantity.

*

According to the U.S. *Mining World*, an alloy called T-Metal, stated to be the "alloy of the year", was placed on the market at the end of 1959. Composed of zinc, copper, titanium and an undisclosed element, projected sales for 1960 are stated to be 32,000,000 lbs.

*

Placer Development, Ltd., has made available an additional $12,000,000 to a wholly-owned subsidiary, Canadian Exploration, to help finance projects in Canada and Australia. Mr. J. D. Simpson, president of Placer Development, announcing this, named the Craigmont copper/iron project in south central British Columbia, and the Mattagami Lake Mines project in Quebec, as requiring substantial amounts for development. It was through Canadian Exploration that Placer Development recently invested $4,500,000 in coal mining and distribution companies in Australia which had established markets both in Australia and Japan.

*

The Mining Club held its Jubilee dinner at the Grocers' Hall in London on Monday of this week. The toast of the Club was proposed by Mr. Frank Byers, a director of Rio Tinto, to which the president of the Club, Mr. St. John R. C. Shepherd responded.

*

Mr. F. M. Zeder, president of Hydrometals, announced at the company's annual meeting in Chicago recently that it is planned to resume production of zinc soon at the Pewabic and Kearney Mines, in New Mexico, which they own jointly with American Zinc, Lead and Smelting Co. Mr. Zeder stated that diamond drilling by American Zinc had indicated some new and higher grade orebodies, and that a new company, Hydrometals S.A., had been formed in Belgium, owned jointly with a Belgian steel concern for European exploitation of the company's Hydro-T-Metal—a zinc alloy containing small amounts of titanium and copper.

The Salzburger Aluminium-Gesellschaft, of Lend, Austria, is to expand its aluminium plant at the cost of 30,000,000 schillings for the first stage. Annual aluminium production will be raised from 7,000 to 10,000 tonnes by the replacement of old furnaces.

*

The Peruvian Ministry of Development and Public Works is preparing a five-year development plan for central, eastern and south-eastern Peru, which will cover, among other projects, the installation of a refining plant in central Peru.

*

News is received from Israel that Mr. Bentov, Minister of Development has stated that mining companies in Israel were paying their way. Timna Copper Works and the Dead Sea potash plant would pay all amortization and a good proportion of interest on invested capital. Negev Phosphates, would also do so for the first time, and future prospects seem encouraging. A Japanese firm is negotiating with Negev Ceramic Materials of Beersheba for an annual order of 12,000 tons of flint clay, after testing a trial shipment of 100 tons.

*

The Ross Institute of Tropical Hygiene will be holding their annual course on tropical hygiene for laymen at the Institute in London, July 4-8, 1960. Enrolment is requested as soon as possible, and further information will be sent to those who have enrolled about a month prior to the date of the course.

*

A decree of February 12, 1958, reserving for the State for a two-year period all the deposits of uranium in the Department of Cuzo, Peru, has been extended for one year.

*

Canadian Copper Refiners, a subsidiary of Noranda Mines, has decided to expand further its refinery at Montreal East, Quebec, by adding four more tankhouse sections. With this addition the plant will have a rated refining capacity of 24,000 tons per month. Eight sections are scheduled to be brought into production by the end of April, making this refinery second largest in the world. Hudson Bay Mining and Smelting Co., has signed a contract effective on April 1, with Canadian Copper Refiners to handle all their copper output for the next eleven years.

*

International Iron, Inc., of Houston, Texas, plan to begin a coring programme soon on their iron deposits on the west coast of Costa Rica. These deposits, tentatively named Hwacas Iron Range, were discovered at the end of 1959 by International Iron, working with Explorade Nacionales de Costa Rica, and are reported to be of major proportions.

Metals and Minerals

South Africa Plans to Produce Uranium Metal

A pilot plant to produce nuclear-grade uranium metal and compounds suitable for nuclear fuels is to be built in Johannesburg and is expected to be in operation before the end of the year. This has been announced by the research director of the S.A. Atomic Energy Board, Dr. A. J. A. Roux, who states that the plant will be capable of producing up to 100 tons of metal a year and will be sited at the Government Metallurgical Laboratories in Johannesburg.

The project will be carried out jointly by the Atomic Energy Board and the Transvaal and Orange Free State Chamber of Mines. It will enable South African scientists and engineers to investigate techniques for the processing of nuclear-grade uranium, and to refine a portion of the Union's own production. The statement adds that this will place the country in a more favourable position to offer uranium, in whatever form it may be required, on a competitive market or for domestic consumption.

Dr. Roux plans to leave South Africa on April 20 to make final arrangements in connection with the purchase of the board's research reactor. He is to have discussions with overseas experts and reactor manufacturers, and will visit countries on the Continent, the U.K., the U.S. and Canada.

According to Mr. H. R. P. A. Kotzenberg, the South African Secretary for Commerce and Industries, there is a good possibility of Japan becoming a buyer of South African uranium. Japan had already bought a small amount of South African uranium oxide and further purchases might be important. Japan, because of a scarcity of coal, is likely to become an important user of nuclear power. As Mr. Kotzenberg points out, producers also have an eye on this potential market. Indeed, Japan was recently reported to have purchased uranium from a Canadian source.

*

According to two reports recently issued by Oak Ridge National Laboratory and Battelle Memorial Institute, considerable research and development appear to be necessary to find commercial uses for depleted uranium. The U.S. Atomic Energy Commission has thousands of tons of this material available in the form of uranium hexafluoride.

The O.R.N.L. report suggests that development studies on a limited number of the more promising applications might include such areas as the use of uranium metal as a constituent of steels or for cathodic protection, the use of uranium compounds as refractories, fabrication of uranium metal into special radiation shielding configurations, and the recovery of concentrated hydrogen fluoride by conversion of uranium hexafluoride to uranium oxides.

The Battelle report suggests several possible applications, including metallurgical applications in special alloys and high-speed steels, and for high-density metals. Metallurgical uses are regarded as offering one of the best possibilities for development of a sizeable market.

LONDON METAL AND ORE PRICES, APRIL 7, 1960

METAL PRICES

Aluminium, 99.5%, £186 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 10s. 6d. lb.
Cerium (99%) net, £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 12s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram
Gold, 249s. 10d.
Iridium, £23/£25 oz. nom.
Lanthanum (98%/99%) 15s. per gram.
Manganese Metal (96%/98%) £275/£285
Magnesium, 2s. 2½d./2s. 3d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £22/£24 oz. nom.
Osmiridium, nom.
Palladium, Imported, £8 12s. 6d.
Platinum U.K. and Empire Refined £30 5s.
Imported £28½/28¾
Quicksilver, £70½/£71 ex-warehouse
Rhodium, £45/£48 oz.
Ruthenium, £16/£18 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 79½d. f. oz. spot and 78⅝d. f'd
Tellurium, 21s. 6d. lb.

ORES AND OXIDES

Antimony Ore (60%) basis		19s. 6d./21s. 6d. per unit, c.i.f.
Beryl (min. 10 per cent BeO)		230s. per l. ton unit BeO
Bismuth		30% 5s. 0d. lb. c.i.f.
		20% 3s. 3d. lb. c.i.f.
Chrome Ore—		
Rhodesian Metallurgical (semifriable 48%)	(Ratio 3 : 1)	£15 5s. 0d. per ton c.i.f.
„ Hard Lumpy 45%	(Ratio 3 : 1)	£15 10s. 0d. per ton c.i.f.
„ Refractory 40%		£11 0s. 0d. per ton c.i.f.
„ Smalls 44%	(Ratio 3 : 1)	£13 5s. 0d. per ton c.i.f.
Baluchistan 48%	(Ratio 3 : 1)	£11 15s. 0d. per ton f.o.b.
Columbite, Nigerian quality, basis 70% combined pentoxides	(Ratio 10 : 1) Nb_2O_5 : Ta_2O_5	175s. per l. ton unit c.i.f.
Fluorspar—		
Acid Grade, Flotated Material		£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)		156s. 0d. ex. works
Lithium Ore—		
Petalite min. 3½% Li_2O		47s. 6d./52s. 6d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O		47s. 6d./52s. 6d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O		75s/85s. per ton f.o.b Beira
Magnesite, ground calcined		£28 0s./£30 0s. d/d
Magnesite Raw (ground)		£21 0s./£23 0s. d/d
Manganese Ore Indian—		
Europe (46%-48%) basis 67s. 6d. freight		73d./75d. c.i.f. nom.
Manganese Ore (43%-45%)		69d./71d. c.i.f. nom.
Manganese Ore (38%-40%)		nom.
Molybdenite (85%) basis		8s. 11d. per lb. (f.o.b.)
Titanium Ore—		
Rutile 95/97% TiO_2 (prompt delivery)		£28 0s. 0d. per ton c.i.f. Aust'n.
Ilmenite 50/52% TiO_2		£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)		147s./151s. per unit c.i.f.
Vanadium—		
Fused oxide 95% V_2O_5		8s./8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) 65-66% ZrO_2		£16/£16 10s. ton c.i.f.

SCANDIUM BY THE POUND

The production of a pound of scandium by Union Carbide International Co., is described as marking the first time that such a "large" quantity of scandium ever existed in one place at one time. The accomplishment also represents the completion of the first of two contracts with the Materials Laboratory, Air Research and Development Command and the Air Material Command of the U.S. Air Force at Wright Air Development Centre. This contract called for one pound (0.45 kg.) of scandium of at least 99 per cent purity. The material is in the form of two discs of scandium about 3⅛ in. dia. and ¼ in. thick. The cost of completing the contract was shared by Union Carbide.

The U.S.A.F. is interested in scandium because this extremely rare metal is believed to have some unique properties. It has a density comparable to aluminium, but at the same time has the relatively high melting point of 1,550 deg. C., which is about 2½ times the melting temperature of aluminium. The second contract, already under way, calls for an analysis of the material by Union Carbide to study its physical, chemical and mechanical properties.

TAX THREAT TO ITALIAN QUICKSILVER

At the annual meeting of the Societa Mineraria per Azioni Monte Amiata, held recently at Rome, it was stated that the company was not in a position to finance development and expansion plans owing to the threat that the manufacturing tax on quicksilver might be reimposed. This tax, which was imposed in November, 1954, was suspended for two years at the beginning of 1959. The company added that, whereas world competition had become more acute, production at Monte Amiata's mines had fallen 28 per cent below 1958 owing to labour troubles. However, sales had shown a good increase both in Italy and abroad, following the temporary suspension of the manufacturing tax.

WOLFRAM PRICE IMPROVES

In the past few days a certain amount of business has matured in wolfram and quotations in London now range from 147s. to 151s. per l.ton unit c.i.f. Europe, compared with 148s. to 152s. recently.

The overall volume of demand is still described as unimpressive, but the reported absence of selling pressure could militate against any marked easing of prices.

OUTLOOK FOR ANTIMONY

In a comprehensive review of antimony, to be published later this year in "Minerals Facts and Problems, 1960 Edition", the Bureau of Mines, U.S. Department of the Interior, concludes that little change can be expected in the international flow of antimony for several years. The outlook for the output of U.S. domestic mines being able to compete with imports is regarded as dim. High mining costs and low recoverable dollar value of domestic ores preclude successful competition with imports and domestic scrap.

The Bureau points out that production of metal, oxide and antimonial lead is relatively inflexible, being related more to smelter production of other metals than to the price of antimony. Then again, antimony has no properties that make it indispensable, and is thus open to substitutes, though in some areas of application it does have technological advantages.

The key to possible expansion of antimony's uses is research, in which connection the report refers to considerable behind-the-scenes activities in the U.S. For example, Battelle Memorial Institute, in a project sponsored by a domestic mining firm, has done much work in developing indium-antimony and aluminium-antimony semi-conductors. Other fields in which research is currently being undertaken include electro-plating of antimonial alloys and applications in pigments, glass and glazes. The view is expressed that perhaps the most promising field is current research, which suggests that the energy-response characteristics of antimony may expand its use.

As regards the immediate outlook, reference might appropriately be made to the scarcity of imported antimony which arose in the U.S. in January this year, causing prices of foreign metal in New York to strengthen by ½ c. to 1.00 c. per lb. The quotation for domestic 99½ per cent antimony, f.o.b. Laredo Texas, unchanged at 29.00 c. per lb., remains appreciably higher than imported metal of similar grade, which is currently at 25 - 26 c. duty paid New York.

The strength of the New York market stems primarily from the long strike at Campine's smelter in Belgium. Demand spurted when supplies of Belgian metal dried up. Consumers started buying more than their normal tonnages, with the result that supplies of practically all brands were taken up.

The increased demand came from such consumers as alloy makers for use in antimonial lead and bearing metals and also from steel mills for deoxidizing purposes. An increased demand has also been noted for antimony oxides, for which encouraging prospects are foreseen, particularly in the ceramic trade, which is reported to be launching a campaign of sales promotion aimed at wider use of its products in home construction.

PERU SUSPENDS TUNGSTEN DUTY

In Peru, a decree dated February 11, 1960, has suspended the collection of the 4 per cent *ad valorem* tax payable on tungsten exports as an advance payment on the exporters' profits tax. This measure has been taken in view of the fall in the price of tungsten in the world market. The suspension will continue in force as long as the price remains at a low level.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

The week has been one of the most indecisive for some time during which copper and tin have remained steady and lead and zinc have developed a firmer undertone after a day of weakness in the latter metal on Monday.

COPPER STILL IN FIRM DEMAND

Consumer demand in Europe and the U.K. for copper still persists and any downward movement in price tends to draw in buyers, both in London and in New York, and so long as this lasts no downward movement in the price is expected. In addition, the political unrest in South Africa is causing some to wonder whether copper supplies from Rhodesia and the Belgian Congo are likely to be interrupted in the relatively near future. On the market, the contango has remained almost unaltered in spite of a further reduction in stocks of 200 tons to the low total of 1,849 tons: some quarters think that a low point in stocks has now been reached and that after a short time of uncertainty they will begin to rise again, as metal is diverted from the U.S. to Europe.

In the U.S., the price structure remains the same and fabricators are still complaining that new orders are not as brisk as expected, but at the same time it must be noted that both customs smelters and producers are well sold for April and that May copper is being asked for from some quarters.

LITTLE CHANGE IN TIN

The tin market has remained relatively stable although the backwardation has shown signs of increasing. Stocks in official warehouses remain virtually unchanged at 7,921 tons. During March shipments of tin from Penang totalled 6,356 tons as compared with 5,549 tons for February and only 3,846 tons in March of last year.

On Thursday the Eastern price was equivalent to £791⅝ per ton c.i.f. Europe.

LEAD STRENGTHENS FURTHER: ZINC RECOVERS

The lead market has developed further strength with quotations rising and this trend is expected to continue as parcels of unsold metal are not numerous. It seems that demand for lead is likely to continue and that the voluntary cutback in availability of the metal is gradually having an effect and a price movement, similar to that which occurred in zinc last year, would not take the market by surprise. The production of lead in O.E.E.C. countries during February totalled 56,494 tonnes as opposed to 59,932 tonnes in January and the monthly figure is 9 per cent above that of 1959: lead stocks are reported at 53,402 tonnes, an increase over the January figure of 50,786 tonnes. In the United States, mining output in January was up by 5 per cent and production of metal by more than 50 per cent owing to the settlement of the strikes and consumption was up by about 2 per cent: stocks showed a decline of about 2 per cent.

The zinc market has been nervous and on Monday buyers were almost completely absent and the market suffered a sharp fall but most of this was subsequently recovered as demand remains good. The O.E.E.C. production in February totalled 72,712 tonnes as opposed to 76,327 tonnes in January and stocks fell sharply to 48,037 tonnes from 53,789 tonnes. In the U.S. it has been reported that the quotas for the first quarter of 1960 were all filled or nearly filled except for that for Belgian zinc which was only filled to the extent of approximately 50 per cent.

The result of the Tariff Commission's investigations into what should be done to aid the domestic mining industry in lead and zinc was published at the end of March and stated that four of the members considered that they were unable to make any recommendation as they considered it outside the province of the Commission: the remaining two members recommended the removal of the import quotas and an increase in the import duties in the case of lead to 3 c. per lb. and in the case of zinc to 2.5 c. per lb. with corresponding increases for the metal contents in ores and concentrates. This result means that the position in the U.S. is unchanged and that the likelihood of the quotas continuing for a considerable time is to be expected.

Closing prices are as follows:

	March 31		April 7	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£254	£255	£255	£255½
Three months ..	£240	£240½	£240¼	£240½
Settlement ..	£255		£255½	
Week's turnover	9,500 tons		8,725 tons	
LEAD				
Current ½ month	£76½	£76⅝	£77⅜	£78
Three months ..	£75⅛	£75⅜	£76⅛	£76¼
Week's turnover	7,975 tons		7,400 tons	
TIN				
Cash	£789	£789½	£789½	£790
Three months ..	£787½	£788	£786½	£787
Settlement ..	£789½		£790	
Week's turnover	210 tons		805 tons	
ZINC				
Current ½ month	£93½	£93¾	£91½	£91⅞
Three months ..	£90⅝	£91	£89¼	£89⅝
Week's turnover	4,050 tons		6,175 tons	

Mining Finance

Western Deep Ignores the Storm

As foreshadowed here on March 11, Western Deep Levels, which is opening up an ultra-deep gold mine to the south of the West Wit line, is to raise fresh funds by an issue of £1 " B " shares which will differ from the existing £1 " A " shares only in that they will not be entitled to a dividend until a total of 10s. a share has been paid on the " A ".

It seems fairly evident that the terms of the pending offer were decided upon without regard to the share market decimation that has taken place in recent weeks. Thus " A " shareholders registered on April 20 are to be offered 1,400,000 " B " shares at 40s. in the ratio of one for four. The " A " shares themselves only stand at 42s. 6d., which makes 40s. for the " B " look much too high in view of the dividend clause, even allowing for the fact that the new " B " carry an option. This is to take up further " B " shares on a one for one basis at 45s. in May of next year.

At the same time as the current offer to " A " shareholders a further 1,400,000 " B " shares are to be offered at 40s. to the members of the loan syndicate that has lent Western Deep the sum of £5,000,000. These " B " shares also carry the option. The whole exercise including the options is aimed at raising £11,900,000 of the further £14,500,000 that is now estimated to be necessary to finance the mine until the third quarter of 1962, when it is expected that gold production from the Ventersdorp Contact reef will start. It will be decided later, it is stated, how the other £2,600,000 will be found.

It is to be presumed that the loan syndicate will automatically take up their part of the offer. Chief participants in this syndicate are Anglo American Corporation, which is in technical control of Western Deep, De Beers Investment Trust, West Rand Investment Trust and Rand Selection. In any case the whole offer of 2,800,000 " B " shares is being underwritten for a cash consideration of 2½ per cent of the issue price by Anglo American, Central Mining Finance and Consolidated Gold Fields. It would hardly embarrass a trio of this calibre if they were left with the whole of the 1,400,000 shares being offered to " A " shareholders.

There is also, of course, some chance that the market situation may look more favourable between April 25 and May 13 when the issue will be actually current. Holders of the " A " thus have no need to come to any decision yet awhile. Western Deep's annual report for 1959 should have been issued before the closing date as well as the report for the March quarter of 1960.

POWER CUT AFFECTS MARCH GOLD-MINING PROFITS

As expected, the March returns from South Africa's gold and uranium mines show numerous lower profits owing to the effect of the power cuts that were forced on some of the mines from March 14 to 18 because of the coal shortage at the power stations caused by the shutdown at the Coalbrook collieries. The Central and Eastern Rand mines were not affected nor was Winkelhaak in the Kinross area. In addition, Randfontein and Freddies Consolidated escaped any ill effects thanks to the former having its own power station. Otherwise, all the Orange Free State and Far Western Rand mines suffered some loss of output and profit. Many of them have gone to the trouble of estimating these losses.

Thus West Driefontein which had made history in February by making over £1,000,000 gross profit in a single month only earned £927,931 last month, but would have made £1,067,771 had it not been for the power cut. This is a good enough indication that this Gold Fields group mine should be back in the million class in April. Its quarterly report, due to be published on April 14, is being awaited with some interest owing to unofficial reports that the Ventersdorp Contact reef is still opening up particularly well from the new No. 5 shaft. If so, this would, incidentally, be of considerable interest to the adjoining Western Deep mine.

DIAMOND SALES DOWN, BUT STILL GOOD

The March quarter diamond sales by the De Beers group's Central Selling Organization had been awaited with a touch of anxiety owing to some fears that the uncertain course of Wall Street, reflecting doubts about the trend of the American economy, might have made a dent in the demand for diamonds in that important consumer country following the record level of business in 1959.

In the event, there has been only a minor falling off in the value of diamonds sold. True, the £20,396,151 total for the March quarter is below last year's exceptional figures, but it is well above the quarterly sales for 1958. In the March quarter of that year the total was £15,289,981. In the first quarter of 1959 a record three-monthly aggregate of £23,586,653 was attained. Sales for the whole of last year reached a best-ever £91,135,943 against only £65,543,387 for 1958.

The gem part of last quarter's sales was £14,026,975. Industrial stones accounted for £6,369,176 compared with a 1959 quarterly average of just over £7,000,000. The latest industrial figure must be regarded as a highly satisfactory one in view of the fact that the U.S. strategic stockpile is no longer in the market for this class of stone, and also in view of the growing competition from The General Electric Company's manufacture of synthetic industrial diamonds in America. The De

LONDON MARKET HIGHLIGHTS

After the plunge of the previous week South African gold shares became a good deal steadier last week. True, the see-saw movements continued as investment demand from Johannesburg was countered by occasional reports of new racial unrest. But the price swings were much less severe than have been seen recently and dealing conditions became more normal.

The calmer situation in South Africa over the week-end coupled with a strong Cape market on the Friday brought a recovery movement on Monday. Fresh disturbances in Cape Town caused a setback on Tuesday, but things improved again on the Wednesday when the anticipated Continental selling orders were replaced by some cautious buying for the first time in weeks.

As was expected, the four-day power cuts that were imposed last month at many Far West Rand and Orange Free State gold and uranium mines following the closure of the Coalbrook collieries caused a setback in many of the March profit figures. But this had little impact on share prices which have had far more to contend with recently than a mere temporary check to company earnings. A notably firm spot was again in Loraine (31s. 4½d.) and reflected continued hopes of a good quarterly report due in a few days.

The March quarter's diamond sales figures, although very satisfactory, failed to equal the previous three months record figures. This was taken as a cue for fresh selling from the Continent and De Beers fell to 140s. before rallying to close 2s. 6d. down at 145s.

Copper shares moved in sympathy with the trends in Kaffirs, but there was not a great amount of business. Chartered at 81s. 10½d. began to look as if they had touched bottom and Nchanga became a much steadier market at 55s. 7½d. In front of the informal meetings of U.K. shareholders, Rhodesian Selection Trust hardened to 12s. 3d.; Roan were a trifle easier at 6s. 9d.

Once again Tin shares steadily moved ahead. Strong local buying lifted Ayer Hitam from 67s. 6d. to 72s. 6d. and there was talk that a scrip issue here could be possible in due course. The market was also stimulated by a fresh batch of increased interims dividends: forerunners to the even higher payments that will eventually reflect the rising earnings of tin producers this year. Last week's payments helped share prices of Malayan (23s.), Southern Malayan (18s. 9d.) and Tronoh (32s. 6d.). Other firm stocks were Tekka (7s. 4½d.) and Beralt (29s. 9d.). The latter company fulfilled its promise to resume interims with a payment of 20 per cent; equal to the single dividend paid for 1958-59.

The U.K. Budget proposals had virtually no effect on mining shares. A possible exception to this was Consolidated Zinc which reacted to 76s. 6d. Because of its many industrial interests the shares of this company tend to follow the course of the U.K. industrial market to some extent. Enthusiasm for U.K. industrials was dampened not so much by the actual Budget proposals, but rather by the warning that the expansion of private credit might be curbed if this was thought to be necessary.

Beers group is, of course, concentrating on furthering the use of natural stones in industry despite its own ability to manufacture synthetic boart if necessary.

In trade quarters there is still a good deal of optimism about business in diamonds during the current year, although there is no expectation that it will reach last year's peaks. There is certainly no present threat to De Beers' higher dividend level of 12s. 6d. per Deferred share achieved in 1959.

WESTERN AREAS—JUST IN TIME

Western Areas Gold Mining had the good fortune to raise its initial capital last November while the Kaffir share market was still in good fettle. This, as the first annual report shows, means that with shaft-sinking now under way the company has funds in hand of £5,600,000 including the money still to be called on the partly-paid shares. The ventilation shaft was down 1,017 ft. on March 1 last which means that if all goes well the Ventersdorp Contact reef should be struck this summer. The main shaft should also now be making progress.

As announced in the prospectus, Western Areas intends to reach its initial production stage of 50,000 tons monthly, probably in 1963, by utilizing part of the treatment plant at the Randfontein mine which is in the same Johannesburg Consolidated group. This should mean both a saving in capital outlay of some £2,500,000 and the provision of revenue towards the erection of the company's own plant when this is deemed necessary.

It has possibly been borne in mind that after 1964 the huge Randfontein plant may, if required, be entirely available for the treatment of Western Areas ore. It is in that year that Randfontein's uranium contract ends. Even if the price of gold goes up it is unlikely that the mine could continue operations long on a non-uranium basis.

Western Areas 10s. units stand at 14s. 9d. With a cost-conscious management schooled by its experience with Freddies Consolidated the mine looks to have a good chance of becoming a profitable medium-grade producer.

TIN DIVIDENDS KEEP RISING

In generally uncertain mining markets tin shares keep remarkably firm. This trend may well continue under the bullish bombardment of a stream of rising dividends. This week Malayan Tin led the way with a second interim of 4½d. per 5s. share on account of the year to June 30 next. This compares with 3d. a year ago, actually equivalent to only 1½d. on the capital as it is now, doubled by the 100 per cent free share issue made last December. In that month the chairman forecast that as a result of rising output quotas and the impact of the company's big new dredge it was expected to pay on the higher capital not less than the 1s. 6d. a share distributed for 1958-59 on the former capital.

The latest interim makes 7½d. to date against 6d. so that it can almost be taken for granted that the forecast rate is going to be exceeded. The market regards a total 2s. as more than likely. Present price of Malayan is 23s. The associated company in the Cheapside group, Southern Malayan, although it has no brand-new dredge to boost its earnings, is also increasing its interim, the second payment now declared for 1959-60 being 4½d. against 3d. This makes 7½d. to date compared with 6d. last year when the distribution was eventually brought up to a total of 1s. 3d. The optimists are now going for 1s. 9d. this year. Southern Malayan 5s. shares stand at 18s. 9d.

TRONOH'S GOOD DIVIDEND

There has also been an above expectations announcement from Tronoh which apart from its tin producing activities has a sizable investment portfolio including, it is believed, holdings in both Malayan and Southern Malayan. Tronoh is a calendar year company. It is still making distributions on account of 1959. The latest, and fourth, interim is 7½d. in amount making 1s. 10½d. to date compared with 1s. 4d. a year previously. On that occasion the interims were followed by a final of 4d. plus 6d. bonus. There is a feeling among the more ebullient market forecasters that for 1959 there might be a final of 7½d. plus 6d. bonus making 3s. in all. If this proves to be too optimistic there is still the prospect that Tronoh should do even better in 1960. The 5s. shares were 32s. 3d.

Beralt, the Portuguese tin and wolfram producer, has resumed interims as foreshadowed by the company last November. The payment of 20 per cent on the 5s. units on account of the year to March 31 is the same as the single distribution for the whole of 1958-59. The interim was up to the best expectations. It largely reflects the company's better profits from wolfram. Beralt being in Portugal has been outside the tin restriction scheme. There is now a natural tendency to expect a final in August of 20 per cent plus. Beralt stand at 29s. 9d.

BRUNSWICK-SOGEMINES AGREEMENT

Brunswick Mining and Smelting Corporation has announced agreement in principle with Sogemines to begin production at its lead-zinc property in New Brunswick. The agreement provides for tentative financing totalling $17,500,000.

First, the St. Joseph Lead Company will purchase at par the balance of the present authorized $7,500,000 of 5 per cent Brunswick Mining bond issue of approximately $1,400,000 and, secondly, Sogemines will purchase, also at par, additional income bonds ranking equally with St. Joseph's but bearing 6½ per cent interest to the amount of $6,500,000.

Sogemines will arrange for the purchase by private interests of senior security to provide $6,500,000. Sogemines will also arrange with a Canadian bank to provide Brunswick Mining's initial working capital of $2,100,000. Concurrently, Brunswick will sell to Sogemines the 1,000,000 shares remaining in the Treasury at par of $1 each to provide $1,000,000.

The initial rate of production would be 2,000 tons daily. Negotiations are reported to provide for a 15-year contract for the sale of concentrates to a group of Belgian base-metal smelters.

South Crofty Turns Loss Into Profit.—South Crofty earned a group net profit of £31,478 in 1959. This is a welcome change in the fortunes of the Cornish tin producer, which last year made a loss of £50,425. No dividend is, however, recommended. Meeting, May 20.

Board Changes.—Mr. Ivon A. Bailey has been appointed deputy chairman of the Mond Nickel Company, and of Henry Wiggin and Company. Mr. Edward Vaughan has been appointed a director of both companies.

FALCON MINES

The Fiftieth Annual General Meeting of Falcon Mines, Limited was held on March 31 at Bulawayo

Mr. F. L. Wigley, Chairman, presiding, said:—The Directors' Report and Accounts together with my Review of the Company's activities, which have been in your hands for some time, give full details of the operations of your Company for the year ended September 30, 1959, and I now propose to give you a brief account of the work done and the results obtained since the close of the financial year.

The tonnage milled at the Dalny Mine for the five months ended February 29, 1960, was 102,000 tons, which yielded 19,460 ounces fine of gold, equal to a recovery of 3.816 dwts. per ton milled. The working profit at the mine for that period, based on a selling price of gold of 245s. 6d. per ounce was £61,408. In addition, £2,998 accrued from sales of gold at prices above 245s. 6d. per ounce in respect of gold produced during the three months ended December 31, 1959.

Regarding development, the total footage advanced during the same period was 4,519 of which 2,085 feet were sampled and 805 feet, equal to 38.6% were payable, averaging 5.5 dwts. per ton over a width of 66 inches.

At the Sunace and Bay Horse Mines the estimated working profits for the five months were £1,843 and £570 respectively.

The working profit for the three mines for the period was thus £66,819, excluding additional revenue which will accrue from the sales of gold at prices in excess of 245s. 6d. per ounce for the months of January and February, 1960.

On March 11, Dividend No. 13 of 6d. per share, equivalent to 10%, was declared payable to Shareholders registered on March 31, 1960. This represents an increase of 2½% (1½d.) per share compared with the dividend declared in March, 1959. Dividend warrants will be posted on or about May 9.

The Report and Accounts were adopted.

Coming Events

The Summer Meeting of the Institution of Mining Engineers will be held in Cardiff, June 29-July 1, 1960, at the invitation of the South Wales Institute of Engineers. Headquarters of the Institution during the period of the Meeting will be at the Park Hotel, Cardiff, and the 119th general meeting of the Institution will be held in the Reardon Smith Lecture Theatre of the National Museum of Wales on June 29 at 11 a.m., and 2.30 p.m. The South Wales Institute has arranged a special programme for students and associates under 30 years of age. Applications from those wishing to attend this summer meeting should be sent to the Institution not later than April 30, 1960.

★

The South Wales Institute of Engineers will meet at Cardiff on May 19, for a lecture by Mr. W. Wilde on "The Aberthaw power station".

★

The Southern Counties Institute of Mining Engineers will hold their Summer Meeting on May 10.

Book Reviews

Science and Resources, *edited by Henry Jarrett. Published by the Johns Hopkins Press, Baltimore, for Resources for the Future, Inc., London, Oxford University Press. pp. 250. Price in the U.K. 40s. net.*

Recently, Resources for the Future, Inc., sponsored six sets of public lectures in Washington, D.C., to review the present resources situation and expectations of the United States. This book is a collection of these essays. In many ways it complements *Perspectives on Conservation*, which resulted from the 1958 RFF Forum. The earlier volume looked at the situation from the standpoint of the first 50 years of the conservation movement, 1908-1958. The treatment was largely historical and from the inside, with emphasis on economics and politics. The present volume largely looks ahead, from the standpoint of outside influences upon resources from the laboratory and industrial plant.

Of particular interest to the mining industry is a chapter devoted to minerals exploration, which includes contributions by John A. S. Adams: "New Ways of Finding Minerals"; James Boyd, "The Pulse of Exploration"; and Paul W. McGann: "Economics of Mineral Exploration".

John Adams points out that future mineral resources will be determined by several mutually dependent technological factors. These include: synthesis of minerals; development of substitute materials; new or greatly expanded demand for particular materials; development of economic techniques for using lower and lower grade ores; new and more extensive exploration for high-grade mineral deposits. Recent developments in synthesis are revolutionizing mineral exploration, it is pointed out. The main problem is becoming one of finding economic sources for the chemical elements.

It would seem both prudent and profitable, concludes Adams, to intensify the research effort on exploration techniques, so that we can make a more complete and useful inventory of the earth. If this is done, there is reason to believe that the retreat to lower and lower grade ores can continue to be orderly, cheap, and skilfully executed, with mineral exploration providing more than ample time for the development of better extraction techniques, superior substitutes, and cheap energy sources.

The Commonwealth's Raw Materials

The Commonwealth Economic Committee has published the second volume of its report on raw materials, *A Review of Commonwealth Raw Materials* (Vol. II, price 35s. net, by post 36s. 5d.). Obtainable from H.M.S.O., or from the Secretary, Commonwealth Economic Committee, 2 Queen Anne's Gate Buildings, Dartmouth St., London, S.W.1. As was stated in the introduction to the first volume, the object of its enquiry was "to show against the background of world conditions the post-war developments, other than those of a purely technical nature, in the production, consumption and trade of Commonwealth raw materials and to compare the post-war with the pre-war position." The first volume traced the main lines of development for the selected raw materials, and gave in summary form a general picture of the raw materials position in the Commonwealth. The assembly of material for Volume I necessitated detailed studies of the raw materials position in the various countries of the Commonwealth. These studies in their turn have been the basis of the country chapters in Volume II.

The intention is excellent, and we wish we were in a position to welcome these studies as throwing useful light on the minerals situation in the Commonwealth. It was, in fact, our hope that to some extent they would help to meet the Commonwealth's urgent need for a comprehensive and up-to-date picture of the minerals situation such as is presented by the commodity studies so admirably undertaken in the United States by the Bureau of Mines. Unfortunately, the value of the Commonwealth Economic Committee's *magnum opus* as a pointer to Commonwealth and world trends, or even as a reference work, is largely nullified by the fact that it has little more than historical interest.

Volume I, which appeared in 1958, took the story as far as 1955. The second volume, published early in 1960, brings it up to 1957, which is the latest year covered by the statistical tables and also, in general, by the text!

In fairness, it should be added that the Committee itself, as stated in the preface to Volume II, is conscious that the facts on which its review is founded are bound, as time goes by, to have less and less value for the conduct of affairs, and asked for authority to keep the contents of the first volume up-to-date. Later, in connection with the Montreal Conference in 1958, the Committee made certain proposals for keeping this volume up-to-date by an extension of its Commodity Series to cover an appropriate range of raw materials. These proposals received the approval of governments.

Now that the framework is there to build on, perhaps the Committee will succeed in catching up with the times, so that in future years it will be in a position to give the Commonwealth's mining industries information which will be of practical value as a basis for studying current trends and making the projections which are essential to long-term development programmes.

MINING ENGINEER

Age 35, with wide practical, planning and administrative experience in senior position, emphasis on copper mining of wide ore bodies, shaft sinking, and some opencast experience, available June or July. Interview anywhere in U.K. Married. Family. Write Box 660, *The Mining Journal*, 15 Wilson Street, Moorgate, London, E.C.2.

Personal

Dowty Rotol Ltd. announce that the re-organization of their engineering department is now completed, and the following arrangement becomes effective on April 1, 1960: Mr. L. G. Fairhurst will be the technical director for the company. Under him Mr. A. A. J. Willitt, will be chief engineer of the Arle Court design department, dealing with traditional Dowty products, and Mr. E. Danvers will be chief engineer to the Staverton design department, dealing with Rotol products. The former design activities of British Messier will be absorbed entirely within the Arle Court design department.

*

Mr. G. E. Howling, for many years member of the Mineral Resources Division of the Colonial Geological Survey, is to retire at the end of April. He will be succeeded as member for this Division by Mr. B. H. Beard.

*

Mr. George Wood, C.B.E., vice-president of Thos. W. Ward, Ltd., died in Sheffield on March 14, 1960, after a long illness.

*

Mr. Bjorn Rosen has arrived in Britain to take up an appointment as managing director of Sandvik Swedish Steels.

*

Mr. Kurt-Allen Belfrage, president and managing director of Atlas Copco A.B., of Sweden, was recently granted a private audience with the Pope.

*

Captain H. Leighton Davis, assistant managing director of the Steel Company of Wales is to succeed Lord Monckton as chairman of the Society and the Council.

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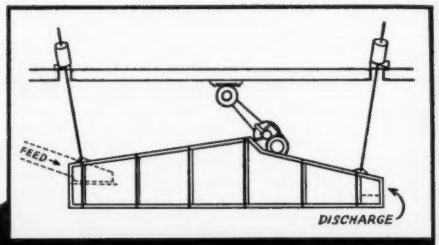

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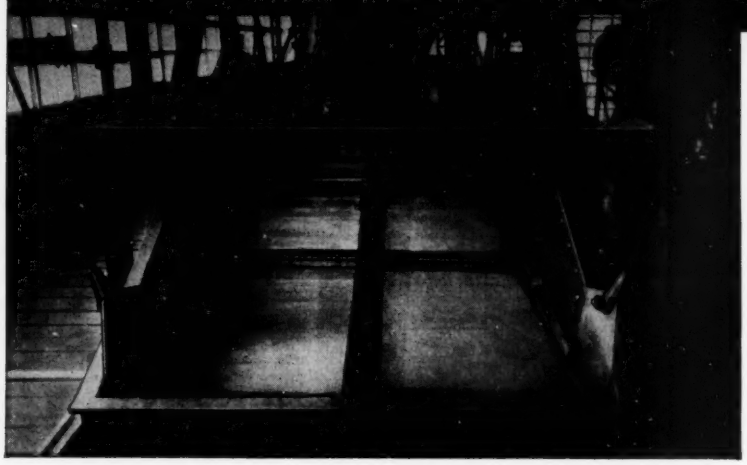

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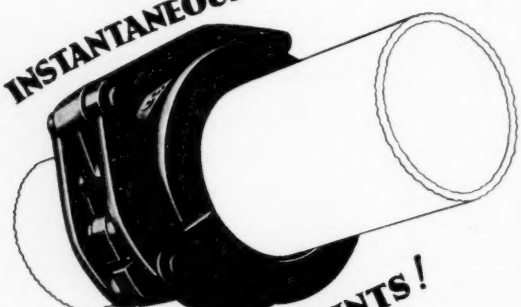

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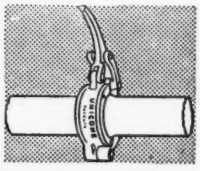

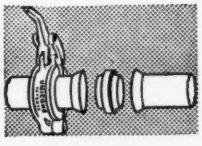

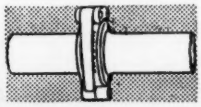

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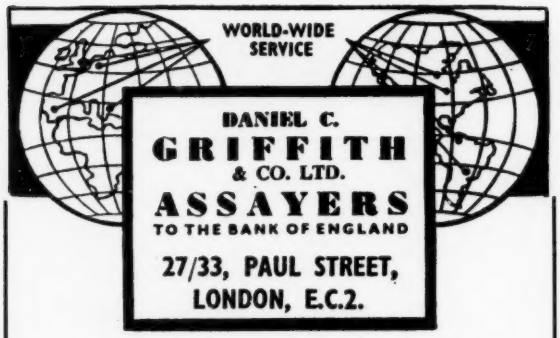

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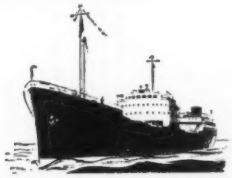

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